Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) Optical apparatus, comprising:

an input optical path (170) connected to one of a plurality of receiver nodes (103) and carrying an input light beam modulated by an input carrier signal modulated by an information signal, the input carrier signal having a radio frequency;

an output optical path (215) connected to one of an array of head-end node receivers (243) and carrying an output light beam modulated by an output carrier signal modulated by the same information signal as the input carrier signal, the output carrier signal having a higher radio frequency than the input carrier signal; and

optical upconverter means (180) for converting the input light beam into the output light beam, said optical converter means connecting said input optical path (170) to said output optical path (215).

2. (Currently Amended) The apparatus of claim 1, further comprising:

an input coupler (175) ~~for connecting~~configured to connect an input fiber (144) to the input optical path (170); ~~and~~

an output coupler (222) ~~for connecting~~configured to connect an output fiber (223) to the output optical path (221);and ~~the optical apparatus further comprises~~

one or more additional input optical paths (171-173) ~~providing~~ configured to provide a plurality of additional input optical paths (170-173) carrying respective additional input light beams modulated by respective additional input carrier signals each modulated by a

respective additional information signal, the additional respective input carrier signals having radio frequencies, ~~wherein~~ and

~~the optical upconverter means is configured to convert the plurality of the respective input light beams carrying the input carrier signals carrying the information signals into the output light beam carrying the higher frequency output carrier signals carrying of the same information signals;~~

one or more additional output optical paths (216-219) each configured to carry a respective additional output light ~~beams~~ beam modulated by respective additional output carrier ~~signals~~ signal modulated by the same information ~~signals~~ signal as corresponding additional input carrier ~~signals~~signal, the respective additional output carrier ~~signals~~ signal having a higher radio frequency than the corresponding additional input carrier ~~signals~~ signal, wherein

the optical upconverter means (180) is further configured to convert the ~~plurality of the~~additional input light ~~beams~~ beam ~~carrying the input carrier signals carrying of the information signals~~ into the ~~plurality of~~additional output light beam ~~beams carrying the higher frequency output carrier signals carrying the same information signals~~, ~~wherein~~ and

a wavelength of the input or output light beams is between 1250 and 1360 nm or between 1500 and 1610 nm, and one of the following conditions is true

a radio frequency of the output carrier signal is at least approximately 2 times higher than a radio frequency of the input carrier signal,

the radio frequency of the input carrier signal is below 100 MHz and the radio frequency of the output carrier signal is above 200 MHz,

the radio frequency of the output carrier signal is between approximately 400 and 900 MHz,

the radio frequency of the output carrier signal is more than approximately 40 times higher than the frequency of the input carrier signal, and

the radio frequency of the input carrier signal is approximately between 5 and 65 MHz and the radio frequency of the output carrier signal is at least 400 MHz.

3. (Currently Amended) The apparatus of claim 1 in which:

the input and output light beams are multicarrier optical signals in which the light beam is modulated by a multitude of carrier signals, each carrier signal of the same light beam has a different radio frequency;

the carrier signals of the same light beam are modulated by different respective information signals;

the output carrier signals are modulated by the same respective information signals as corresponding input carrier signals having lower frequencies;

the output carrier signals have different respective radio frequencies all within a frequency band with a band width of approximately less than one octave, so that the maximum frequency of a carrier in the band is less than or equal to approximately 2 times the minimum frequency of a carrier in the band, so that essentially all second order distortions of the multicarrier signal can be filtered out;

the output carrier signals have radio frequencies within a frequency band with a width of approximately less than half an octave, so that the maximum frequency of a carrier in the band is less than or equal to approximately 1.5 times the minimum frequency of a carrier in the band, so that essentially all fourth order distortions of the multicarrier signal can be filtered out;

the multiple carrier signals of the input light beam have radio frequencies in a frequency band extending at least between approximately 5 and 45 MHz and the corresponding carrier signals in the output light beam have radio frequencies in a band with a minimum carrier frequency above 400 MHz; wherein the apparatus further comprises:

~~one~~ two or more additional output optical paths (216-219) each configured to carry respective additional output light beams which are multicarrier optical output signals, said two or more additional output optical paths ~~each~~ including a corresponding first additional output light beam modulated by a multitude of carrier signals in a first additional frequency band and a corresponding second additional output light beam modulated by a multitude of carrier signals in a second additional frequency band, ~~and in which~~wherein the first and second additional frequency bands do not overlap; wherein

the carrier frequencies of each the first additional frequency bands are selected from the group between approximately 200 MHz and approximately 800 MHz; and the carrier frequencies of the second additional frequency bands are selected from the group between approximately 300 MHz and approximately 1200 MHz so that a respective pair of first and second additional frequency bands do not overlap;

the wavelengths of two of the output light beams are separated by a difference between 0.4 nm and 1.6 nm.

4. (Original) The apparatus of claim 1 in which:

the optical upconverter means (180) includes:

optical receiver means (181) for converting the input light beam carrying the input carrier signal into an input electronic current signal carrying the same input carrier signal;

electronic upconverter means (200) for converting the input electronic current signal modulated by the input carrier signal modulated by the information signal into an output electronic current signal modulated by the higher frequency output carrier signal modulated by the same information signal; and

optical transmitter means (209) for converting the output electronic current signal carrying the higher frequency carrier signal into the output light beam carrying the same higher frequency output carrier signal.

5. (Withdrawn) The apparatus of claim 4 in which:

the optical transmitter means (209) includes

a lens system (267),

means (258) for biasing the output electronic signal,

a power amplifier (260), and

one of a directly modulated laser (262) and a distributed feedback laser (262);

the optical receiver means (181) includes a PIN photo-diode (286) and a preamplifier (288); and

the optical apparatus further comprises

a controller (225) configured to dynamically control the wavelength of the lasers during operation;

one or more additional input optical paths (171-173), providing a plurality of input optical paths (170-173) carrying respective input light beams modulated by respective input carrier signals modulated by a different respective information signals; wherein the optical receiver means is further configured to convert the plurality of input light beams into respective electronic input current signals carrying

the respective input carrier signals; and the electronic upconverter means (200) is further configured to convert the plurality of input current signals carrying the input carrier signals into the output electronic current signal carrying output carrier signals with higher frequencies than the input carrier signals and carrying the same information signals; and the electronic upconverter means (200) further includes combining means (310) for combining multiple electronic current signals into a single electronic current signal; and

one or more additional output optical paths (216-219) to provide a plurality of output optical paths (215-219) carrying respective output light beams modulated by respective output carrier signals corresponding with the input carrier signals of the plurality of input light beams and having a radio frequency higher than the input carrier signals, the output carrier signals being modulated by the same information signals as the corresponding input carrier signals; the electronic upconverter means (200) is further configured to convert the plurality of input electronic current signals into a plurality of output electronic current signals modulated by the higher frequency output carrier signals modulated by the same information signals; and the optical transmitter means (209) convert the plurality of output electronic current signals carrying the higher frequency output carrier signals into respective output light beams carrying the same higher frequency output carrier signals in the output optical paths (215-219);

wherein the combining means (310) is further configured to convert 4 or more input electronic signals into one output electronic signal.

6. (Currently Amended) A wavelength multiplexing fiber hub, comprising:

a multitude of return signal input optical paths (170-173), each connected to one of a plurality of receiver nodes (103) and carrying different respective return input light beams each modulated by a different respective multitude of return input carrier signals, for each return input light beam, the respective multitude of return input carrier signals are modulated by different respective return information signals and each have a different radio frequency;

a plurality of return signal output optical paths (215-219), each connected to one of an array of head-end node receivers (243) and carrying respective return output light beams, each modulated by a respective multitude of return output carrier signals, and for each return output light beam, the respective multitude of return output carrier signals are modulated by a different one of the return information signals, the return output carrier signals each having a different radio frequency, the radio frequencies of the return output carrier signals being higher than the radio frequencies of the return input carrier signals;

optical upconverter means (180) for converting the multitude of return input light beams carrying the return input carrier signals carrying the return information signals into the plurality of return output light beams carrying the higher frequency return output carrier signals carrying the return information signals; and

signal routing means including return combining means (220) for combining the return output light beams from the plurality of return output optical paths (215-219) into a common hub optical fiber (223).

7. (Withdrawn) The hub of claim 6, in which:

the hub further comprises a multitude of forward signal optical paths (160-164) carrying respective forward light beams modulated by respective multitudes of forward carrier signals, and for, each forward light beam, each forward carrier signal is modulated by

a different respective forward information signal and each forward carrier signal has a different radio frequency;

the hub further comprises common node fibers (540) for respective return input optical paths (570); and the signal routing means routs respective forward light beams from respective forward signal optical paths (556) into respective common node fibers (540) and routs respective return input signal from respective common node fiber (540) into respective return input optical paths (575), so that in each common node fiber, a forward light beam travels away from the hub and a return light beam travels toward the hub;

the signal routing means includes a node wavelength division multiplexer (572) for each common node fiber which routs respective forward light beams from respective forward signal optical paths (556) into respective common node fibers (540) and routs respective return input signal from respective common node fiber (540) into respective return input optical paths (575);

the signal routing means includes a hub wavelength division multiplexer (524) for routing forward light beams from the common hub fiber (154) into respective forward signal optical paths (160-164);

the hub wavelength division multiplexer (524) routs return light beams from forward signal optical paths (563) into the common hub fiber; and

the hub further comprises a broadcast signal optical path (501) carrying a broadcast light beam modulated by a multitude of broadcast carrier signals modulated by different respective broadcast information signals, the broadcast carrier signals each have a different radio frequency; and the signal routing means include splitter means (504,552) for dividing the broadcast light beam into a multitude of similar broadcast light beams in respective broadcast signal optical paths (505-508) for respect common node fibers; and the node

wavelength division multiplexers rout the broadcast light beams from respective broadcast signal optical paths (505-508) into respective common node fibers (540-541).

8. (Currently Amended) A multiplexing fiber hub, comprising:

a multitude of return input optical paths (170-173), each connected to one of a plurality of receiver nodes (103) and carrying respective return input light beams, each beam modulated by a multitude of return input carrier signals modulated by different corresponding return information signals, and for each return input light beam, the radio frequencies of the return input carrier signals of the return input light beam are mutually different;

a plurality of return output optical paths (215-219), each connected to one of an array of head-end node receivers (243) and carrying respective return output light beams, each beam modulated by a multitudes of return output carrier signals respectively modulated by the same return information signals as corresponding return input carrier signals, the return output carrier signals having a higher radio frequency than the return input carrier signals;

optical receiver means (181) for converting the multitude of return input light beams carrying the return input carrier signals into corresponding return input electronic current signals carrying the same return input carrier signals;

electronic upconverter means (200) for converting the multitude of return input electronic current signals carrying the return input carrier signals carrying. the return information signals into a plurality of return output electronic current signal carrying the higher frequency return output carrier signals carrying the same return information signals;

optical transmitter means (209) for converting each return output electronic current signal carrying the higher frequency return output carrier signals into a corresponding return output light beam carrying the same higher frequency return output carrier signals in an

output optical path, each return output light beam having a different wavelength, so that each one of the plurality of return output optical paths carries a corresponding one of the plurality of return output light beams; and

output routing means (220) for combining the return output light beams from the plurality of return output optical paths (215-219) into a common hub fiber (223) carrying the plurality of return output light beams.

9. (Previously Presented) The optical upconverter of Claim 1, further comprising:

receiving means (302-303) for receiving a first plurality of multicarrier electronic first signals, each including a multitude of first carrier signals modulated by different respective information signals, the frequency of the carrier signals in the same multicarrier signal are all different, the frequencies of a plurality of the carrier signals of different first electronic signals are approximately the same, the first carrier signals of each first electronic signal being within the same first frequency band;

conversion means (304-305, 310) for converting and combining the respective first signals into a single multicarrier electronic second signal including a multitude of second carrier signals of mutually different respective frequencies and modulated respectively by the same information signals as the first signals, the frequencies of the second carrier signals are within a second frequency band, the maximum carrier frequency of the second band being at least 2 times higher than the maximum carrier frequency of the first band; and

transmission means (312) for transmitting the second signal.

10. (Currently Amended) The optical upconverter of claim 9 in which:

the information signals of each first signal modulate respective second carrier signals with frequencies within a different subband of the second frequency band;

the frequency band width of the first frequency band is more than an octave;

the frequency band width of the second frequency band is one of

less than an octave, and

less than half an octave;

the minimum frequency of the second band is one of

more than the maximum frequency of the first band,

more than 2 times higher than the maximum frequency of the first band, and

more than approximately 6 times higher than the maximum frequency of the first band; and

the maximum frequency of the first frequency band is one of

below 100 MHz ~~and~~ when the minimum frequency of the second band is above 200 MHz,

below approximately 65 MHz ~~and~~ when the minimum frequency of the second band is above approximately 400 MHz, and

above approximately 5 MHz and below approximately 65 MHz, and the first band width is more than 3 octaves, ~~and~~ when the minimum frequency of the second band is approximately above 400 MHz and approximately below 650 MHz, and the second band width is less than half an octave.

11. (Previously Presented) The optical upconverter of claim 9 in which:

the receiving means (753-754) communicates with respective coaxial cable networks to receive the first plurality of first electronic signals;

the conversion means includes a plurality of electronic frequency converters (757-758) configured to convert the respective first electronic signals into different respective third multicarrier electronic signals, each of the third multicarrier electronic signals including a portion of the second carrier signals with frequencies within a subband of the second frequency band; and a combiner (759) for combining the third electronic signals into the second electronic signal; and

the upconverter further comprises an optical transmitter (760) for converting the single second electronic signal into a first multicarrier optical signal.

12. (Previously Presented) The optical upconverter of claim 9 in which:

the upconverter further comprises an optical transmitter (800) for converting the single second electronic signal into a first multicarrier optical signal; and

the conversion means includes:

first frequency converters (797,798) for converting the respective first electronic signals into different respective third multicarrier electronic signals, each including a multitude of third carrier signals, the frequencies of the third carrier signals of each third electronic signal being within a different subband of a third frequency band, the maximum frequency of the third frequency band being at least approximately the minimum frequency of the first frequency band plus the frequency band width of the first frequency band times the number of first multicarrier signals in the first plurality of signals;

a combiner (799) for combining the third electronic signals into a single fourth multicarrier electronic signal with third carrier signals in the third frequency band;

first optical transmitter (800) for converting the fourth electronic signal into a first multicarrier optical signal;

an optical receiver (820) for converting the first optical signal into a fifth multicarrier electronic signal;

a second converter (821) for converting the fifth electronic signal into the second electronic signal with second carrier signals in the second frequency band, the minimum frequency of the second frequency band being higher than the maximum frequency of the third frequency band and; and

a second optical transmitter (822) for converting the single second signal into a second multicarrier optical signal.

13. (Withdrawn) The optical upconverter of claim 9 in which:

the receiving means (302-303) includes a plurality of optical receivers (182-183) for converting respective first multicarrier optical signals into the first plurality of first multicarrier electronic signals;

the conversion means includes: frequency converters (304-305) for converting the respective first electronic signals into different respective third multicarrier electronic signals, each having a portion of the second carrier signals with carrier frequencies in a different respective portion of the frequency band of the second carrier signals; and a combiner (310) for combining the third electronic signals into the second electronic signal; and

the upconverter further comprises an optical transmitter (210) for converting the single second electronic signal into a second multicarrier optical signal.

14. (Withdrawn) The optical upconverter of claim 9 in which:

the receiving means communicates with respective coaxial cable networks (833-834) to receive fourth multicarrier electronic signals equal in number to the first plurality of first electronic signals; the receiving means includes optical transmitter means (838) for converting the fourth electrical signals into respective first multicarrier optical signals;

the receiving means includes optical receiver means (861) for converting the first optical signals respectively into the first electronic signals;

the conversion means include: frequency converter (862) for converting the respective first electronic signals into different respective third multicarrier electronic signals, each including a portion of the second carrier signals with frequencies within a subband of the second frequency band; and a combiner for combining the third electronic signals into the second electronic signal; and

the upconverter further comprises an optical transmitter (865) for converting the single second electronic signal into a second multicarrier optical signal.

15. (Previously Presented) A hybrid cable fiber node (752) using the optical upconverter of claim 9, comprising:

an enclosure (766) containing the apparatus of the node;

means (767-768) for connecting a plurality of coaxial cable networks (753-754) to the node;

upconverter means (757-758) for receiving a plurality of multicarrier first electronic return signals from respective coaxial cable networks, the multicarrier signals each including a multitude of carrier signals modulated by different respective information signals, the frequency of each carrier signal in the same multicarrier signal being different, with

frequencies of the carrier signals of all the first return signals being within the same first frequency band, and for converting the respective first electronic return signals of into different respective second electronic return signals with frequencies of the carrier signals of each second return signal within a different subband of a second frequency band with a frequency band width that is less than one octave;

first electronic combining means (759) for combining the second electronic return signals into a single third electronic return signal with frequencies of carrier signals within the second frequency band;

means (769) for connecting a first optical fiber (762) for carrying an optical signal from the node; and

optical transmitter means (760) for converting the third electronic return signal into a first optical return signal.

16. (Original) The node of claim 15, in which:

the node further comprises: first optical receiver means (764) for converting a forward optical signal into a respective electronic forward signal in one or more of the coaxial cable networks; and filter means (755-756) for separating the first electronic return optical signals from the electronic forward signals in respective coaxial cable networks and providing the first return signals to the upconverter means.

17. (Withdrawn) The node of claim 16, in which:

the optical receiver means and the optical transmitter means communicate with the same end of a common optical fiber (762);

the node further comprises second optical receiver means (819) for converting an optical broadcast signal into an electronic broadcast signal; and

second electronic combiner means (810) for combining the electronic broadcast signal with each of the electronic forward signals.

18. (Withdrawn) A communication system using the optical upconverter of claim 9, comprising:

a multitude of optical fibers (113, 124-128, 144-148, 154, 223);

gateway means (402) for providing a plurality of first electronic broadcast signals and;

first modulating means (413) for modulating a multitude of first carrier signals with the first electronic broadcast signals;

first combining means (414) for combining the modulated first carrier signals into a second multicarrier electronic broadcast signal;

first optical transmitter means (106) for converting the second broadcast signal into a multicarrier optical broadcast signal;

first optical routing means (108,114) for splitting the optical broadcast signal into a plurality of multicarrier optical broadcast sub-signals in respective optical fibers;

a multitude of coaxial cable networks (136-140);

first receiver means (135) for converting the optical broadcast node signals into respective third electronic multicarrier broadcast signals in the coaxial cable networks;

customer interface means (380-381) connected to the coaxial cable networks (771) for receiving the third electronic broadcast signals;

the gateway means provide a multitude of first electronic service signals for computer and telephone communications services, the first Electronic service signals being divided into

a multitude of destination groups, each destination group including a multitude of information signals for transmission one or more coaxial cable networks;

second modulating means (431) for modulating groups of second carrier signals with respective groups of first electronic service signals;

second combining means (433) for combining the modulated second carrier signals of each group into a respective second multicarrier electronic service signal;

second optical transmitter means (435) for converting the second service signals into respective multicarrier optical service signals; second optical routing means (153, 158) for multiplexing a plurality of the optical service signals into each fiber (452) of a plurality of common optical fibers (452-453) for respective fiber hubs, and for each common fiber, the optical service signals in the fiber having different optical wavelengths; and for wavelength demultiplexing the plurality of optical service signals from each common optical fiber into respective optical fibers;

the first receiver means (135) convert the optical service signals in the respective fibers into respective third electronic multicarrier service signals in the coaxial cable networks;

the customer interface means receive the third electronic service signals;

the customer interface means (380-381) provide a multitude of first electronic multicarrier return signals, each first electronic return signal including a multitude of third carrier signals modulated by different respective information signals, the frequency of the carrier signals in the same multicarrier signal are all different, the frequencies of a plurality of the third carrier signals of the first electronic return signals are approximately the same as other first electronic return signals, the frequencies of the third carrier signals of each first electronic return signal being within the same first frequency band;

conversion means (181, 200) for converting and combining a group of one or more first electronic return signals into a respective single second multicarrier electronic signal including a multitude of fourth carrier signals, each of a different frequency, modulated respectively by the same information signals as in the respective group of first electronic return signals, with frequencies of the fourth carrier signals within a second frequency band, the minimum carrier frequency of the second band being higher than the maximum carrier frequency of the first band;

third optical transmitter means (209) for converting the multitude of second electronic return signals into respective first multicarrier optical return signals in respective optical fibers;

third optical routing means (220, 240) for multiplexing a group of multiple first optical return signals from respective optical fibers into each fiber of multiple common optical fibers, for each common fiber,, the first optical return signals in the fiber have different optical wavelengths; and for wavelength demultiplexing the multiple first optical return signals from each common optical fiber;

second receiver means (243) for converting the first optical return signals into respective third multicarrier return signals; separating means (439) for separating each of the fourth carrier signals from each of the third return signals; and

demodulating means (440) for extracting the information signals t from respective fourth carrier signals and providing the extracted information signals to the gateway means;

and in which the gateway means (402-404) receive the extracted information signals.

19. (Original) Method of providing optical communications, comprising the steps of: providing an electronic multicarrier communication signal;

converting the multicarrier electronic communication signal into a first multicarrier optical communication signal including a multitude of carrier signals modulated by respective information signals, with the frequencies of the carrier signals different from f each other and within a first frequency band;

converting the first multicarrier optical signal into a second multicarrier optical signal including a multitude of carrier signals with frequencies in a second frequency band with a minimum frequency higher than a maximum frequency of the first frequency band.

20. (Withdrawn) The method of claim 19 in which:

the method further comprises: providing a third multicarrier optical return signal including a multitude of carrier signals with frequencies in a third frequency band with a minimum frequency higher than a maximum frequency of the first frequency band and a wavelength sufficiently different from a wavelength of the second frequency band so that the optical signals can be combined together into one optical fiber and separated by a wavelength division demultiplexer; and combining the second and third optical return signals into the same optical fiber;

the second and third frequency bands have different non-overlapping ranges so that the minimum frequency of any carrier signal in the third frequency band is less than the maximum frequency of any carrier signal in the second frequency band;

the minimum frequencies of carrier signals in the second and third frequency bands are at least 4 times higher than the maximum frequency of the carrier signals in the first frequency band;

the minimum frequencies of carrier signals in the second frequency bands is at least approximately 200 MHz;

the minimum frequencies of carrier signals in the second frequency bands is at least approximately 400 MHz;

the maximum frequency of the third frequency band is 1200 MHz; the width of the second and third frequency bands are less than an octave;

the width of the second and third frequency bands are less than half an octave.

21. (Previously Presented) The method of providing optical communications, of claim 19, comprising the steps of:

providing a respective multitude of customer interface units connected to each of a multitude of coaxial cable networks;

generating a first electronic multicarrier signal in each of the coaxial cable networks, using the multitude of the customer interface units connected to each network, with the frequencies of carrier signals of the first electronic signal in each coaxial network in the same first frequency band;

providing one or more hybrid fiber cable nodes;

providing one or more optical fibers;

converting one or more forward multicarrier optical signals from one of the optical fibers into forward multicarrier electronic signals in the coaxial cable networks;

separating the multitude of first electronic signals in the coaxial cable networks into a multitude of separated first electronic signals in the nodes;

first converting a first plurality of separated first electronic signals in the nodes into a single second electronic multicarrier signal with frequencies of carrier signals in a second frequency band having a minimum carrier frequency higher than a maximum carrier

frequency of the first frequency band and a width of the second frequency band is less than one octave; and

second converting the second electronic signal into a first optical multicarrier signal in a first one of the optical fibers, with frequencies of carrier signals in the second frequency band.

22. (Withdrawn) The method of claim 21 in which:

the method further comprises third converting a second plurality of separated first electronic signals in the nodes into a single third electronic multicarrier signal with frequencies of carrier signals in a third frequency band having a minimum carrier frequency higher than a maximum carrier frequency of the first frequency band and a frequency band width of less than one octave; and

the method further comprises fourth converting the third electronic signal into a second optical multicarrier signal in the first one of the optical fibers, with frequencies of carrier signals in the third frequency band and a light wavelength sufficiently different from a light wavelength of the first optical signal so that the first and second optical signals can be separated by a wavelength division demultiplexer.

23. (Withdrawn) The method of claim 21 in which:

the method further comprises providing a fiber hub;

and the first converting includes:

third converting the first plurality of separated first electronic signals in the nodes into a corresponding plurality of second optical signals in one or more of the optical fibers, with frequencies of carrier signals in a third frequency band;

fourth converting the plurality of second optical signals in the one or more optical fibers into one or more third electronic multicarrier signals in the hub, with frequencies of carrier signals in the third frequency band;

fifth converting the frequencies and combining the carrier signals of the third electronic signals to provide the single second electronic signal.

24. (Withdrawn) The method of claim 23 in which:

there are a plurality of nodes and each of the nodes is connected to a single respective coaxial cable network;

the third converting uses a respective optical transmitter in each node to provide the second optical signals in different respective optical fibers with frequencies of the carrier signals in the first band;

the fourth converting converts each of the second optical signals in a respective optical fiber into a respective third electronic signal with frequencies in the third band;

the frequency ranges of the first and third bands are approximately equal;

the fifth converting includes: converting the frequencies of carrier signals of the third electronic signals to provide respective fourth electronic signals each with carrier frequencies in a different subband of the second frequency band; and combining the fourth electronic signals into the single second electronic signal.

25. (Withdrawn) The method of claim 21 in which the first converting includes:

third converting the plurality of separated first electronic signals in the nodes into a plurality of respective third electronic multicarrier signals with frequencies of carrier signals of each third electronic signal in a different subband of a third frequency band having

maximum carrier frequency at least equal to the minimum carrier frequency of the first frequency band plus the number of second electronic signals converted into the first optical signal times the width of the first frequency band;

fourth converting the plurality of third electronic signals into the second signal.

26. (Withdrawn) The method of claim 25 in which:

the third frequency band of the third electronic signals has the same frequency range as the second frequency band of the second electronic signals;

and the first converting further includes combining the third electronic signals to form the second electronic signals.

27. (Withdrawn) The method of claim 25 in which:

the method further comprises providing a fiber hub;

the maximum carrier frequency of the third frequency band is less then the minimum carrier frequency of the second frequency band;

the third converting includes:

combining the plurality of third electronic signals into a single fourth electronic signal with frequencies of carrier signals in the third frequency band;

fifth converting the fourth electronic signal into a second optical multi-carrier signal in one of the optical fibers with frequencies of carrier signals in the third frequency band;

sixth converting the second optical signal in the optical fiber into a fifth electronic signal in the hub, which is approximately a duplicate of the fourth electronic signal;

seventh converting the fifth electronic signal with frequencies of carrier signals in the third frequency band into the second electronic signal with frequencies of carrier signals in the second frequency band.